IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: Steven C. Dzik, Appellant	§	
	§	Group Art Unit: 2616
Serial No.: 09/829,314	§	
Confirmation No.: 7112	§	
	§	Examiner: Justin M. Philpott
Filed: 4/9/2001	§	
For: METHOD AND APPARATUS FOR JITTER AND FRAME ERASURE CORRECTION IN PACKETIZED VOICE COMMUNICATION SYSTEMS	§	

MAIL STOP APPEAL BRIEF-PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

APPEAL BRIEF

Appellant submits this Appeal Brief to the Board of Patent Appeals and Interferences on appeal from the decision of the Examiner of Group Art Unit 2616 dated April 20, 2006, finally rejecting claims 1-35. The final rejection of claims 1-35 is appealed. This Appeal Brief is believed to be timely filed by the due date of September 20, 2006, as set by mailing a Notice of Appeal on July 20, 2006. The Commissioner is authorized to charge the $500 Appeal Brief filing fee, and any additional fees required to make this Appeal Brief timely and acceptable to the Office, to counsel's Deposit Account No. 20-0782/LCNT/121853.

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Real Party in Interest

The present application has been assigned to Lucent Technologies Inc. of Murray Hill, New Jersey.

Related Appeals and Interferences

Appellant asserts that no other appeals or interferences are known to Appellant, Appellant's legal representative, or assignee, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of Claims

Claims 1-35 are pending in the application. Claims 1-35 were originally filed in the application; claims 1-28, 30-31, and 33-34 have been amended. Claims 1-35 stand finally rejected as discussed below. The final rejections of claims 1-35 are appealed. The pending claims are shown in the attached Claims Appendix.

Status of Amendments

A response was filed on March 2, 2005 in response to a First Office Action dated December 7, 2004. In the First Office Action, the Examiner objected to the drawings and rejected claims 1-35 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Publication No. US 2003/0112796 by Kwan (hereinafter "Kwan"). In the response filed on March 2, 2005, the Appellant provided replacement drawing sheets and amended claims 1-5, 8-17, and 20-26, and set forth arguments traversing the rejections issued by the Examiner.

A response was filed on August 31, 2005 in response to a Final Office Action dated July 6, 2005. In the Final Office Action, the Examiner rejected claims 2-4 and 8-26 under 35 U.S.C. § 112 and maintained the rejection of claims 1-35 under 35 U.S.C. § 102(e) as being anticipated by Kwan. In the response filed on August 31, 2005, the Appellant amended claims 1-4, 8-16, 20-27, and 31, and set forth arguments traversing the rejections issued by the Examiner.

An RCE was filed on October 5, 2005 in response to a first Advisory Action dated September 14, 2005. In the first Advisory Action, the Examiner refused to enter the amendments proposed by the Appellant in the previous response, asserting that the amendments recited new limitations which raise new issues that would require further consideration and/or search. In the RCE filed on October 5, 2005, the Appellant submitted the second response filed on August 31, 2005.

A response was filed on February 3, 2006 in response to a non-final Office Action dated November 22, 2005. In the non-final Office Action, the Examiner rejected claims 1-35 under 35 U.S.C. § 103(a) as being unpatentable over Kwan in view of U.S. Patent No. 6,356,545 to Vargo et al. (hereinafter Vargo"). In the response filed on February 3, 2006, the Appellant amended claims 1, 5-13, 17-28, 30-31, and 33-34, and set forth arguments traversing the rejections issued by the Examiner.

A response was filed on June 20, 2006 in response to a Final Office Action dated April 20, 2006. In the Final Office Action, the Examiner rejected claims 1-35 under 35 U.S.C. § 103(a) as being unpatentable over Kwan in view of Vargo, further in view of U.S. Patent Application Publication No. US 2003/0016699 A1 by McClary et al.

(hereinafter "McClary"). In the response filed on June 20, 2006, the Appellant set forth arguments traversing the rejections issued by the Examiner.

The Examiner responded to the Appellant's response of June 20, 2006 with a second Advisory Action dated July 3, 2006. In the second Advisory Action, the Examiner asserted that the Appellant's response to the final Office Action did not place Appellant's application in condition for allowance. More specifically, the second Advisory Action reiterated the Examiner's rejections of the Appellant's claims enumerated in the Final Office Action dated April 20, 2006.

The claims on appeal are those of the response filed on June 20, 2006 in response to the Final Office Action dated April 20, 2006.

Summary of Claimed Subject Matter

The embodiments of the present invention are generally directed to apparatus, method, and computer-readable medium for improving the quality of packetized voice through the use of time scaling to compensate for distortions created by missing, delayed, and out of sequence voice packets. Time scaling using embodiments of the present invention allows the lengths of packets to be expanded or reduced without affecting the spectral qualities of the speech contained in the voice packet. Thus, the present invention advantageously produces a continuous stream of voice for a listener using reductions or expansions to lengths of respective packets transporting the voice samples, where the reductions or expansions to the lengths of the packets are difficult for the listener to detect.

A method according to at least one embodiment of the invention includes retrieving a first packet from an input buffer. The first packet has an associated length. A pitch associated with audio information contained in the first packet is determined. A determination is made as to whether a second packet of audio samples has arrived at the input buffer, where the second packet has an expected arrival time and an associated length. In response to a determination that the second packet arrives after the expected arrival time, the length of the first packet is adjusted using at least one pitch period associated with the pitch. The length of the second packet is adjusted according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet.

An apparatus according to at least one embodiment of the invention includes a first VoIP gateway for retrieving a first packet from an input buffer, where the first packet has an associated length. The first VoIP gateway determines pitch associated with audio information contained within the first packet. The first VoIP gateway determines whether a second packet of the audio information has arrived at the input buffer, where the second packet has an expected arrival time and an associated length. The first VoIP gateway, responsive to a determination that the second packet arrives after the expected arrival time, adjusts the length of the first packet using at least one pitch period associated with the pitch. The first VoIP gateway adjusts the length of the second

packet according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet.

An apparatus for expanding and reducing audio information within packets according to at least one embodiment of the invention includes a processor, and a storage device coupled to the processor for controlling the processor. The processor includes instructions operative to retrieve a first packet from an input buffer, where the first packet has an associated length. The processor includes instructions operative to determine pitch associated with audio information contained within the first packet. The processor includes instructions operative to determine whether a second packet of the audio information has arrived at the input butter, where the second packet has an expected arrival time and an associated length. The processor includes instructions operative to, in response to a determination that the second packet arrives after the expected arrival time, adjust the length of the first packet using at least one pitch period associated with the pitch, and adjust the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet.

A computer readable medium according to at least one embodiment of the invention has stored thereon a plurality of instructions which, when executed by a processor, enable the processor to perform a method. The method includes retrieving a first packet from an input buffer, where the first packet has an associated length. A pitch associated with audio information contained in the first packet is determined. A determination is made as to whether a second packet of audio samples has arrived at the input buffer, where the second packet has an expected arrival time and an associated length. In response to a determination that the second packet arrives after the expected arrival time, the length of the first packet is adjusted using at least one pitch period associated with the pitch. The length of the second packet is adjusted according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet.

A method according to at least one embodiment of the invention includes processing a sequence of audio samples, each of said samples being stored within a respective packet. The method includes retrieving a first packet from an input buffer,

determining a pitch within the audio samples for the retrieved packet, determining whether a second packet of the audio samples has arrived at the input buffer, and, in response to a determination that the second packet arrives after an expected arrival time associated with the second packet, adjusting a play time for the retrieved packet using at least one pitch period associated with the pitch based on an actual arrival time of the second packet. The method further includes adjusting a play time for the second packet based on the adjusted play time of the first packet and an actual arrival time of a third packet.

For the convenience of the Board of Patent Appeals and Interferences, Appellant's independent claims 1, 13, 25, 26 and 27 are presented below in claim format with reference numerals corresponding to the figures, and appropriate citations to at least one portion of the specification for each element of the appealed claims.

Claim 1 positively recites (with reference numerals added, where applicable):

1. A method of processing a sequence of audio samples, each of said samples being stored within a respective packet, said method comprising:

retrieving a first packet (202) from an input buffer (122_{B1}), said first packet having an associated length; (See Appellant's specification, Pg. 5, Lines 20-22).

determining pitch associated with audio information contained within said first packet; (See Appellant's specification, Pg. 7, Line 25 – Pg. 8, Line 9).

determining whether a second packet (204) of said audio samples has arrived at said input buffer, said second packet having an expected arrival time and an associated length; (See Appellant's specification, Pg. 7, Lines 10-19).

in response to a determination that the second packet arrives after the expected arrival time, adjusting said length of said first packet using at least one pitch period associated with said pitch; and (See Appellant's specification, Pg. 7, Lines 23-30).

adjusting the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet (206) received after the second packet. (See Appellant's specification, Pg. 8, Lines 5-12).

Claim 13 positively recites (with reference numerals added, where applicable):

13. An apparatus comprising:

a first VoIP gateway (128) for retrieving a first packet (202) from an input buffer (122_{B1}), said first packet having an associated length; (See Appellant's specification, Pg. 5, Lines 20-31).

said first VoIP gateway determining pitch associated with audio information contained within said first packet; (See Appellant's specification, Pg. 7, Line 25 – Pg. 8, Line 9).

said first VoIP gateway determining whether a second packet (204) of said audio information has arrived at said input buffer, said second packet having an expected arrival time and an associated length; (See Appellant's specification, Pg. 7, Lines 10-19).

said first VoIP gateway adjusting said length of said first packet using at least one pitch period associated with said pitch, responsive to a determination that said second packet arrives after the expected arrival time; (See Appellant's specification, Pg. 7, Lines 23-30).

said first VoIP gateway adjusting the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet (206) received after the second packet. (See Appellant's specification, Pg. 8, Lines 5-12).

Claim 25 positively recites (with reference numerals added, where applicable):

25. (Previously presented) An apparatus for expanding and reducing audio information within packets, comprising:

a processor (320); and

a storage device (330) coupled to said processor for controlling said processor, said processor comprising instructions operative to:

retrieve a first packet (202) from an input buffer (122_{B1}), said first packet having an associated length; (See Appellant's specification, Pg. 5, Lines 20-31).

determine pitch associated with audio information contained within said first packet; (See Appellant's specification, Pg. 7, Line 25 – Pg. 8, Line 9).

determine whether a second packet (204) of said audio information has arrived at said input butter, said second packet having an expected arrival time and an associated length; (See Appellant's specification, Pg. 7, Lines 10-19).

in response to a determination that the second packet arrives after the expected arrival time, adjust said length of said first packet using at least one pitch period associated with said pitch; and (See Appellant's specification, Pg. 7, Lines 23-30).

adjust the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet (206) received after the second packet. (See Appellant's specification, Pg. 8, Lines 5-12).

Claim 26 positively recites (with reference numerals added, where applicable):

26. A computer readable medium having stored thereon a plurality of instructions including instructions which, when executed by a processor, ensures the processor to perform a method comprising:

retrieving a first packet (202) from an input buffer (122_{B1}), said first packet having an associated length; (See Appellant's specification, Pg. 5, Lines 20-31).

determining pitch associated with audio information contained within said first packet; (See Appellant's specification, Pg. 7, Line 25 – Pg. 8, Line 9).

determining whether a second packet (204) of said audio information has arrived at said input buffer, said second packet having an expected arrival time and an associated length; and (See Appellant's specification, Pg. 7, Lines 10-19).

in response to a determination that the second packet arrives after the expected arrival time, adjusting said length of said first packet using at least one pitch period associated with said pitch; and (See Appellant's specification, Pg. 7, Lines 23-30).

adjusting the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet (206) received after the second packet. (See Appellant's specification, Pg. 8, Lines 5-12).

Claim 27 positively recites (with reference numerals added, where applicable):

27. A method of processing a sequence of audio samples, each of said samples being stored within a respective packet, said method comprising:

retrieving a first packet (202) form an input buffer (122_{B1}); (See Appellant's specification, Pg. 5, Lines 20-31).

determining a pitch within said audio samples for said retrieved packet; (See Appellant's specification, Pg. 7, Line 25 – Pg. 8, Line 9).

determining whether a second packet (204) of said audio samples has arrived at said input buffer, said second packet having an expected arrival time; (See Appellant's specification, Pg. 7, Lines 10-19).

in response to a determination that the second packet arrives after the expected arrival time, adjusting a play time for said retrieved packet using at least one pitch period associated with said pitch based on an actual arrival time of the second packet; and (See Appellant's specification, Pg. 7, Lines 23-30).

adjusting a play time for said second packet based on the adjusted play time of the first packet and an actual arrival time of a third packet (206). (See Appellant's specification, Pg. 8, Lines 5-12).

Grounds of Rejection to be Reviewed on Appeal

Claims 1-35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. US 2003/0112796 by Kwan (hereinafter "Kwan") in view of U.S. Patent No. 6,356,545 to Vargo et al. (hereinafter Vargo"), further in view of U.S. Patent Application Publication No. US 2003/0016699 A1 by McClary et al. (hereinafter "McClary").

Arguments

I. THE EXAMINER ERRED IN REJECTING CLAIMS 1-35 UNDER 35 U.S.C. § 103(a) BECAUSE THE CITED REFERENCES, ALONE OR IN COMBINATION, FAIL TO TEACH OR SUGGEST AT LEAST ADJUSTING THE LENGTH OF THE SECOND PACKET ACCORDING TO THE ADJUSTED LENGTH OF A FIRST PACKET AND AN ARRIVAL TIME OF A THIRD PACKET RECEIVED AFTER THE SECOND PACKET.

A. 35 U.S.C. § 103(a) – Claim 1:

The Examiner rejected claim 1 in the Final Office Action dated April 20, 2006 as being unpatentable over Kwan in view of Vargo further in view of McClary. Appellant respectfully traverses the rejection.

The Examiner alleges that, with respect to claim 1, Vargo teaches adjusting the length of a second packet. Specifically, in the second Advisory Action (dated July 3, 2006), the Examiner states that "Vargo teaches processing that includes adjusting the length of, e.g., a second packet (e.g., see Vargo at col. 7, lines 6-26 regarding varying packet size by "dynamically changing the…packet size…from packet to packet", and col. 11, lines 34-47 regarding stretching data for packet transmission, which teaches applicant's claim language of "adjusting the length of the second packet according to the length of a first packet'." (Second Advisory Action, Pg. 2). The Examiner further alleges that McClary teaches a method of processing packets which further includes time adjustment according to timing information of the arrival time of packets (citing paragraph 0078 of McClary), concluding that the cited portion of McClary teaches Appellant's limitation of adjusting the length of the second packet according to an arrival time of a third packet received after the second packet. Appellant respectfully disagrees.

Appellant respectfully submits that Kwan, Vargo, and McClary, either alone or in combination, fail to teach or suggest Appellant's invention of at least claim 1, as a whole. Namely, Kwan, Vargo, and McClary, either alone or in combination, fail to teach or suggest at least the limitation of "adjusting the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet received

after the second packet," as taught in Appellant's invention of at least claim 1. Specifically, Appellant's claim 1 positively recites:

> A method of processing a sequence of audio samples, each of said samples being stored within a respective packet, said method comprising:
> retrieving a first packet from an input buffer, said first packet having an associated length;
> determining pitch associated with audio information contained within said first packet;
> determining whether a second packet of said audio samples has arrived at said input buffer, said second packet having an expected arrival time and an associated length;
> in response to a determination that the second packet arrives after the expected arrival time, adjusting said length of said first packet using at least one pitch period associated with said pitch; and
> adjusting the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet.
> [Emphasis added.]

The Appellant's invention teaches adjustment of the length of a first packet where a second packet has not timely arrived to the input buffer (i.e., has arrived after an expected arrival time of the second packet). As taught in Appellant's invention of at least claim 1, the adjustment of the length of the first packet is performed using at least one pitch period associated with the pitch of the audio information contained within the first packet. Furthermore, Appellant's invention adjusts the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet.

In contrast to Appellant's invention of claim 1, Kwan teaches a lost packet recovery engine which replaces missing voice with synthesized voice using the linear predictive coding model of speech. In particular, the Kwan reference discloses that the "algorithm uses previous digital voice samples or a parametric representation thereof, to estimate the contents of lost packets when they occur. Using the parameters determined from the voice analysis, one frame of voice is synthesized 201." (Kwan, Para. 0225-0230, Emphasis added). In other words, the Kwan reference teaches creation of an entirely new frame to replace a lost frame (i.e., packet). The lengths of frames in Kwan are not adjusted. Rather, information associated with the frames is used for synthesizing new frames to replace lost frames. The creation of an entirely new

packet to replace a missing packet, as taught in Kwan, is simply not adjustment of the length of a packet, as taught in Appellant's invention of at least claim 1. Thus, Kwan fails to teach or suggest at least the limitation of "adjusting the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet," as taught in Appellant's invention of claim 1.

Furthermore, Vargo and McClary fail to bridge the substantial gap between Kwan and Appellant's invention.

In the Final Office Action dated April 20, 2006, and the second Advisory Action dated July 3, 2006, the Examiner cites a specific portion of Vargo for teaching Appellant's limitation of "adjusting the length of the second packet according to the adjusted length of the first packet," as taught in Appellant's claim 1. Specifically, in the second Advisory Action, the Examiner states that "Vargo teaches processing that includes adjusting the length of, e.g., a second packet (e.g., see Vargo at col. 7, lines 6-26 regarding varying packet size by "dynamically changing…the packet size…from packet to packet", and col. 11, lines 34-47 regarding stretching data for packet transmission), which teaches applicant's claim language of 'adjusting the length of a second packet according to the length of a first packet'." (Advisory Action, Pg. 2). Appellant respectfully disagrees.

In general, Vargo discloses a technique for eliminating dead air spaces in a voice data transmission stream by speeding up or slowing down a buffer data rate. (Vargo, Abstract). More specifically, Vargo states that packet size and packet bundling may be dynamically changed from packet to packet. As disclosed in Vargo, two packets may be bundled together to form one larger packet, or a packet size may be changed, e.g., by changing a packet from 64 bytes of information to 32 bytes of information. More specifically, the portions of Vargo cited by the Examiner state:

> "Instead of changing the packet redundancy, the voice port can also dynamically vary the packet size or bundling. The packet size may initially be 67 bytes, with 64 bytes of information and a 3 byte header. The packet bundling may be changing by bundling two 64 byte packets together with a 3 byte header to give a 131 byte packet. Or, the packet size could be changed from 64 bytes to 32 bytes of information to give a 35 byte packet, including a 3 byte header. Both the packet size and packet bundling can be changed by the voice port from packet to packet in the

> data stream to accommodate the loss characteristics of the Internet at that particular time.
>
> Furthermore, not only does the voice port have the capability of dynamically changing the redundancy, packet size and packet bundling from packet to packet, but also the voice port can similarly vary the codec algorithm from packet to packet. The packet is given self-describing information about what type of codec is needed at the receiver to decompress the packet. The choice of codec at the transmitter may be derived from a complex function of choices of packet redundancy, packet size and packet bundling."
>
> (Vargo, Col. 7, Lines 6 – 26, Emphasis added)

With respect to dynamically changing packet bundling, Vargo teaches that two packets may be changed by bundling the two packets together. In other words, with respect to packet bundling, as taught in Vargo, the result of the processing of the two packets is a single packet. By contrast, as taught in Appellant's claim 1, the result of the processing of the two packets is still two packets, where the length of a first packet is adjusted using at least one pitch period associated with the pitch of the first packet and the length of a second packet is adjusted according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet. As such, the concatenation of two packets to form one larger packet, as taught in Vargo, simply does not teach or suggest adjusting the length of one packet, as taught in Appellant's claim 1.

With respect to dynamically changing packet length, although Vargo mentions that the length of the packet may be varied, Vargo fails to teach or suggest a method by which the length of the packet may be varied. Rather, Vargo merely offers a conclusory statement that the length of a packet may be varied, as well as an example in which the length of a packet is reduced from 64 bytes to 32 bytes of information. This general, conclusory statement in Vargo does not teach or suggest the packet length adjustment of Appellant's invention of claim 1. Rather, Vargo is devoid of any teaching or suggestion of adjusting the length of a packet according to an adjusted length of a previously adjusted packet. Furthermore, Vargo is devoid of any teaching or suggestion of adjusting the length of a packet according to an arrival time of a subsequent packet received after the packet being adjusted.

Furthermore, in the second Advisory Action dated July 3, 2006, the Examiner seems to imply that the phrase "packet to packet" used in Vargo teaches a dependency

between packets with respect to packet length adjustment; however, the cited phrase merely indicates that each packet, taken individually, may be dynamically changed with respect to packet bundling and packet size. In other words, the phrase "packet to packet" in Vargo, at most, indicates that each packet is eligible for dynamic changing of packet bundling or packet size. The phrase "packet to packet" in Vargo in no way teaches any dependency or relationship between packets with respect to dynamic changes to the sizes of packets.

In other words, Vargo fails to teach or suggest that the dynamic changing of the packet size of one packet is dependent on any characteristic of another packet, much less a characteristic of a preceding packet and a characteristic of a subsequent packet, as taught in Appellant's claim 1. More specifically, Vargo fails to teach or suggest that the packet size of a second packet may be dynamically changed according to the adjusted packet size of a first packet. Furthermore, Vargo fails to teach or suggest that the packet size of the second packet may be dynamically changed according to the arrival time of a third packet received subsequent to the second packet. As described hereinabove, Vargo is devoid of any teaching or suggestion of any dependency or relationship between packets with respect to dynamic changes to the sizes of packets. As such, Vargo fails to teach or suggest at least the limitation of "adjusting the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet," as taught in Appellant's claim 1.

Furthermore, in the Final Office Action and the Advisory Action referenced above with respect to Vargo, the Examiner cites another portion of Vargo (Col. 11, Lines 34-52) for teaching the packet length adjustments of Appellant's invention of at least claim 1. Specifically, the Examiner cites the phrase "stretching the data remaining in the buffer", as taught in Vargo, for teaching the packet length adjustments of Appellant's invention of at least claim 1. The cited portion of Vargo, however, merely refers to the rate at which packets are read from the buffer, not to any adjustments to the lengths of the packets in the buffer. In other words, as taught in Vargo, stretching data remaining in the buffer involves reducing the rate at which the packets are read from the buffer.

As such, the Appellant submits that the Examiner's assertions with respect to the teachings of Vargo and, specifically, with respect to the phrase "stretching the data"

from the cited portion of Vargo, are incorrect. This is especially clear from a reading of the cited portion of Vargo, as well as lines immediately following the cited portion of Vargo, which specifically state that "the software further contains a utility that senses when the data buffer becomes depleted, and stretches the data reaching the ear of the listener in a manner opposite to the technique utilized in television commercials and radio voiceovers to speed up the data rate. Effectively, the algorithm contains a lever that measures the number of packets in the buffer, and, without changing pitch, speeds up or slows down the data rate without changing pitch corresponding to the pool depth." (Vargo, Col. 11, Lines 42-50, Emphasis added).

In other words, the portion of Vargo cited by the Examiner does not teach or suggest adjusting the length of a packet, much less adjusting the length of a second packet according to the adjusted length of a first packet and an arrival time of a third packet received after the second packet, as taught in Appellant's claim 1. Rather, the portion of Vargo cited by the Examiner in the Final Office Action, and again in the second Advisory Action, refers to adjustments to the data rate at which packets are read from the buffer. The adjustment of a data rate at which packets are read from a buffer, as taught in Vargo, is simply not adjusting the length of a packet, as taught in Appellant's claim 1. As such, for at least the reasons discussed hereinabove, Appellant respectfully submits that Vargo, alone or in combination with Kwan, fails to teach or suggest at least the limitation of "adjusting the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet," as taught in Appellant's invention of claim 1.

Furthermore, McClary fails to bridge the substantial gap as between Kwan and Vargo and Appellant's invention.

McClary generally discloses a method and apparatus for alignment of TDM-based signals for packet transmission using framed and unframed operations. As taught in McClary, a line card in a network element includes a deframer module that receives Time Division Multiplexing (TDM) signals including a payload and overhead data, and generates frame alignment data based on the overhead data. McClary, however, fails to teach or suggest adjusting the length of a packet, as taught in

Appellant's claim 1. McClary is devoid of any teaching or even suggestion of any packet length adjustment.

First, McClary fails to teach or suggest adjusting the length of a second packet according to the adjusted length of the first packet, as taught in Appellant's claim 1. Furthermore, as described hereinabove, Kwan and Vargo, alone or in combination, fail to teach or suggest adjusting the length of a second packet according to the adjusted length of a first packet. Thus, since each of Kwan, Vargo, and McClary fails to teach or suggest adjusting the length of a second packet according to the adjusted length of the first packet, any combination of Kwan, Vargo, and McClary (assuming such combination is even possible, which Appellant submits it is not, as described herein below) must also fail to teach or suggest adjusting the length of a second packet according to an adjusted length of a first packet. As such, Kwan, Vargo, and McClary, alone or in combination, fail to teach or suggest at least the limitation of "adjusting the length of the second packet according to the adjusted length of the first packet," as taught in Appellant's invention of claim 1.

Second, as admitted by the Examiner in the Final Office Action dated April 20, 2006, Kwan and Vargo, alone or in combination, fail to teach or suggest adjusting a length of a second packet according to an arrival time of a third packet received after the second packet. Thus, the Examiner cites Vargo to show a suggestion or motivation to cite another reference for teaching this limitation of Appellant's invention. Specifically, the Examiner cites portions of Vargo to show a suggestion to cite McClary, and then cites McClary for teaching the additional limitation of Appellant's invention not taught by the combination of Kwan and Vargo. More specifically, the Examiner states that "...at the time of the invention it would have been obvious to one of ordinary skill in the art to adjust the length of packets in Vargo (e.g., see Vargo, col. 7, lines 6-26 and col. 11, lines 34-37) according to timing information of the arrival time of the packets as taught in McClary (e.g., see McClary, paragraph 0078) since Vargo specifically encourages utilizing techniques that are well known in the art for time adjustment (e.g., see col. 11, lines 20-23) such as in McClary." (Final Office Action, April 20, 2006, Pg. 4, Emphasis added). Appellant respectfully disagrees.

Assuming that Vargo did provide some suggestion or motivation for one skilled in the art to turn to the teachings of McClary (which, for reasons described herein below, Appellant submits that Vargo clearly does not), the timing information taught in McClary, in combination with the teachings of Kwan and Vargo, would still fail to teach or suggest Appellant's invention of claim 1. Specifically, as described hereinabove, McClary generally discloses a method and apparatus for alignment of TDM-based signals for packet transmission using framed and unframed operations. More specifically, McClary discloses techniques for adjusting the timing of the operation of a framer or deframer of a line card on which a TDM signal originates or is terminated. Thus, the teachings of McClary are completely unrelated to the teachings of Kwan and Vargo, as well as Appellant's invention of claim 1.

Although the Examiner only cites paragraph [0078] of McClary for teaching performing an adjustment according to an arrival time of a packet, differences between McClary and Appellant's invention, as well as between McClary and the teachings of Kwan and Vargo, may be better understood with respect to the following portions of McClary:

> "[0077] Moreover, with regard to timing between a given deframer at the line card where a TDM signal is to be packetized and the corresponding framer where the packetized signal is reconstructed, a number of mechanisms may be employed. In an embodiment, the framer on the line card where the TDM signal is packetized and the framer on the line card where the signal is reconstructed from packetized data are timed from a common network clock, while the far end network element sending the TDM signal to be packetized is loop timed (i.e., its framer is timed according to the signal received by its deframer). In one embodiment, the framer where the TDM signal is reconstructed and the framer at the far end network element where the signal originated are both timed from a common network clock that is distributed by some other transmission path.
>
> [0078] In an embodiment, the framer where the TDM signal is reconstructed and the framer where such signal originates are not constrained to have common timing, thereby allowing frame-slips to occur. In one embodiment, the timing of the framer where the signal is reconstructed is adjusted according to timing information inferred from the arrival time of the packets and/or the length of the queue of packetized TDM data to be sent. In an embodiment, the timing of the TDM signal to be packetized is compared against the network clock. Accordingly, a measure of the deviation is placed in the packets of the TDM data and

> transmitted to where the TDM signal is reconstructed and used to adjust the timing of the framer therein. However, embodiments of the present invention are not so limited. For example, in another embodiment, the deviation from the network clock can be communicated to the reconstructing line card by other means or transmission paths. The above-described embodiments of the techniques to provide timing between a given deframer and framer are by way of example and not by way of limitation, as other techniques to allowing for such timing can be incorporated into embodiments of the present invention."
> [McClary, Para. 0078 – 0079, Emphasis added].

From the portions of McClary cited above, it is clear that McClary has nothing to do with adjusting the lengths of packets, as taught in Appellant's invention. Rather, McClary merely teaches controlling the timing of the operation of a framer (or deframer) for reconstructing a received signal. More specifically, as stated in the above-cited portion of McClary, McClary teaches that, rather than controlling the timing of the operation of a framer using network clock signals, the timing of the operation of a framer on which a signal is reconstructed may be controlled according to timing information inferred from the arrival times of packets. In other words, McClary merely teaches that timing information inferred from the arrival time of a packet sent from a transmitting system may be used as a pseudo clock signal which controls the timing of the operation of the framer on the receiving system, such that the operation of the transmitting and receiving systems is synchronized.

First, McClary does not teach or suggest that the arrival times of packets are used to control the timing of the operation of a framer. Rather, as taught in McClary, timing information that is used to control the operation of a framer is inferred from the arrival times of the packets. Thus, as taught in McClary, it is not the arrival times of the packets which are used to control the timing of the operation of the framer, but, rather, information inferred from such arrival times. As such, even assuming McClary could be operably combined with Kwan and Vargo (which Appellant maintains McClary cannot), the combination of Kwan, Vargo, and McClary would still fail to teach or even suggest performing any action according to an arrival time of a third packet received after the second packet, much less adjusting the length of a second packet according an arrival time of a third packet received after the second packet, as taught in Appellant's claim 1.

Second, although McClary states that the timing of the operation of a framer on which a signal is reconstructed may be controlled by timing information inferred from the arrival time of packets, McClary fails to teach or suggest any relationship between the arrival of a specific packet and the reconstruction of a signal. Specifically, McClary fails to teach or suggest that an arrival time of a subsequent packet (i.e., third packet) at a framer is used to control the timing of the processing of a current packet (i.e., second packet) by the framer. In fact, McClary fails to teach or suggest anything with respect to the ordering of received packets, or that the order in which packets are received may be used in controlling the timing of the operation of the framer. In other words, McClary still fails to differentiate between a previous packet, a current packet, or a subsequent packet. Rather, McClary merely includes a general statement that timing information is inferred from the arrival times of packets. This general statement in McClary does not teach or suggest adjusting the length of a second packet according to the adjusted length of a first packet and an arrival time of a third packet received after the second packet, as taught in Appellant's claim 1.

As such, assuming McClary could be operably combined with Kwan and Vargo (which Appellant maintains McClary cannot), the combination of Kwan, Vargo, and McClary would still fail to teach or suggest taking any action according to an arrival time of a third packet received after the second packet, much less adjusting the length of a second packet according an arrival time of a third packet received after the second packet, as taught in Appellant's claim 1. Thus, assuming McClary could be operably combined with Kwan and Vargo, the combination of Kwan, Vargo, and McClary would still fail to teach or suggest Appellant's invention of claim 1. Namely, the combination of Kwan, Vargo, and McClary would still fail to teach or suggest adjusting the length of a second packet according to the adjusted length of a first packet and an arrival time of a third packet received after the second packet. As such, Kwan, Vargo, and McClary, alone or in combination, fail to teach or suggest Appellant's invention of at least claim 1, as a whole.

Furthermore, the Appellant respectfully submits that there is no suggestion or motivation to combine the teachings of Kwan, Vargo, and McClary. With respect to suggestion or motivation to combine the teachings of McClary with the teachings of

Kwan and Vargo, in the Final Office Action (dated April 20, 2006) cited above, the Examiner asserts that "Vargo specifically encourages utilizing techniques that are well known in the art for time adjustment." The Examiner cites Col. 11, Lines 20-23 of Vargo in support of this assertion. The cited portion of Vargo, however, merely states that "[i]t is also possible to vary the size of individual packets or to vary the bundling of the packets by techniques that are well known in the art." (Vargo, Col. 11, Lines 20-23, Emphasis added). Vargo does not state techniques well known in the art for time adjustment. The Examiner impermissibly reads the words "for time adjustment" into the Vargo reference in an attempt to provide a suggestion or motivation for citing McClary against Appellant's claims. Thus, there is no support for the Examiner's assertion that one skilled in the art would turn to McClary for teachings related to timing information.

Furthermore, Kwan and Vargo are directed toward correcting for jitter, packet losses, and other problems associated with the transmission of packetized voice, such that the quality of the voice heard at the receiving device is not diminished. By contrast, McClary is directed toward controlling timing of the operation of a framer using timing information inferred from the arrival time of packets. McClary has nothing to do with the respective packet replication and packet bundling adjustment teachings of Kwan and Vargo. Thus, the Appellant respectfully submits that there is no suggestion or motivation to combine the teachings of Kwan, Vargo, and McClary.

The test under 35 U.S.C. §103 is not whether an improvement or a use set forth in a patent would have been obvious or non-obvious; rather the test is whether the claimed invention, considered as a whole, would have been obvious. Jones v. Hardy, 110 USPQ 1021, 1024 (Fed. Cir. 1984) (emphasis added). Thus, it is impermissible to focus either on the "gist" or "core" of the invention, Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 230 USPQ 416, 420 (Fed. Cir. 1986) (emphasis added). Moreover, the invention as a whole is not restricted to the specific subject matter claimed, but also embraces its properties and the problem it solves. In re Wright, 6 USPQ 2d 1959, 1961 (Fed. Cir. 1988) (emphasis added). Kwan, Vargo and McClary alone or in combination fail to teach or suggest Appellant's invention as a whole.

Therefore, Appellant submits that independent claim 1 is not obvious and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder. Furthermore,

claims 2-12 depend, either directly or indirectly, from independent claim 1, and recite additional features therefor. Accordingly, for at least the same reasons discussed above, Appellant submits that these dependent claims are also not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

B. 35 U.S.C. § 103(a) – Claims 13-24:

Independent claim 13 is an apparatus claim that recites limitations similar to those recited in independent claim 1. At least because Kwan, Vargo, and McClary, alone or in combination, do not render obvious Appellant's invention as recited in independent claim 1, the Appellant respectfully submits that independent claim 13 is also not rendered obvious by Kwan, Vargo, and McClary, alone or in combination, and is allowable for at least the reasons stated in Section A.

Specifically, independent claim 13 includes the limitation "said first VoIP gateway adjusting the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet." As such, and for at least the same reasons stated in Section A, the Appellant submits that Kwan, Vargo, and McClary, alone or in combination, do not render obvious Appellant's invention as recited in independent claim 13.

Therefore, Appellant submits that independent claim 13 is not obvious and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder. Furthermore, claims 14-24 depend, either directly or indirectly, from independent claim 13, and recite additional features therefor. Accordingly, for at least the same reasons as discussed above, Appellant submits that these dependent claims are also not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

C. 35 U.S.C. § 103(a) – Claim 25:

Independent claim 25 is an apparatus claim that recites limitations similar to those recited in independent claim 1. At least because Kwan, Vargo, and McClary, alone or in combination, do not render obvious Appellant's invention as recited in independent claim 1, the Appellant respectfully submits that independent claim 25 is

also not rendered obvious by Kwan, Vargo, and McClary, alone or in combination, and is allowable for at least the reasons stated in Section A.

Specifically, independent claim 25 includes the limitation "adjust the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet." As such, and for at least the same reasons stated in Section A, the Appellant submits that Kwan, Vargo, and McClary, alone or in combination, do not render obvious Appellant's invention as recited in independent claim 25.

Therefore, Appellant submits that independent claim 25 is not obvious and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

D. 35 U.S.C. § 103(a) – Claim 26:

Independent claim 26 is a computer readable medium claim that recites limitations similar to those recited in independent claim 1. At least because Kwan, Vargo, and McClary, alone or in combination, do not render obvious Appellant's invention as recited in independent claim 1, the Appellant respectfully submits that independent claim 26 is also not rendered obvious by Kwan, Vargo, and McClary, alone or in combination, and is allowable for at least the reasons stated in Section A.

Specifically, independent claim 26 includes the limitation "adjusting the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet." As such, and for at least the same reasons stated in Section A, the Appellant submits that Kwan, Vargo, and McClary, alone or in combination, do not render obvious Appellant's invention as recited in independent claim 26.

Therefore, Appellant submits that independent claim 26 is not obvious and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

E. 35 U.S.C. § 103(a) – Claims 27-35:

Independent claim 27 is a method claim that recites limitations similar to those recited in independent claim 1. At least because Kwan, Vargo, and McClary, alone or in combination, do not render obvious Appellant's invention as recited in independent

claim 1, the Appellant respectfully submits that independent claim 27 is also not rendered obvious by Kwan, Vargo, and McClary, alone or in combination, and is allowable for at least the reasons stated in Section A.

Specifically, independent claim 27 includes the limitation "adjusting a play time for said second packet based on the adjusted play time of the first packet and an actual arrival time of a third packet." As such, and for at least the same reasons stated in Section A, the Appellant submits that Kwan, Vargo, and McClary, alone or in combination, do not render obvious Appellant's invention as recited in independent claim 27.

Therefore, Appellant submits that independent claim 27 is not obvious and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder. Furthermore, claims 28-35 depend, either directly or indirectly, from independent claim 27, and recite additional features therefor. Accordingly, for at least the same reasons as discussed above, Appellant submits that these dependent claims are also not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

CONCLUSION

Thus, Appellant submits that none of the claims presently in the application are obvious under the provisions of 35 U.S.C. §103. Consequently, Appellant believes all these claims are presently in condition for allowance.

For the reasons advanced above, Appellant respectfully urges that the rejections of claims 1-35 as being obvious under 35 U.S.C. §103 are improper. Reversal of the rejections of the Final Office Action is respectfully requested.

Respectfully submitted,

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CLAIMS APPENDIX

1. (Previously presented) A method of processing a sequence of audio samples, each of said samples being stored within a respective packet, said method comprising:

retrieving a first packet from an input buffer, said first packet having an associated length;

determining pitch associated with audio information contained within said first packet;

determining whether a second packet of said audio samples has arrived at said input buffer, said second packet having an expected arrival time and an associated length;

in response to a determination that the second packet arrives after the expected arrival time, adjusting said length of said first packet using at least one pitch period associated with said pitch; and

adjusting the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet.

2. (Previously presented) The method of claim 1, wherein said adjusting comprises:

processing at least two adjacent pitch periods to produce a new pitch period.

3. (Previously presented) The method of claim 2, wherein said new pitch period replaces said at least two adjacent pitch periods.

4. (Previously presented) The method of claim 2, wherein said new pitch period is inserted between two of said at least two adjacent pitch periods.

5. (Previously presented) The method of claim 1 further comprising:

determining the length of the second packet.

6. (Previously presented) The method of claim 1, further comprising:

determining an estimated time of arrival (ETA) of the third packet.

7. (Previously presented) The method of claim 6, wherein a target play time comprises the ETA and a latency period of the third packet.

8. (Previously presented) The method of claim 5, wherein the length of the second packet is reduced in response to a timely arrival of the third packet at said input buffer.

9. (Previously presented) The method of claim 8, wherein the length of the second packet is not reduced by a factor greater than two.

10. (Previously presented) The method of claim 9, wherein the length of the second packet is reduced by deleting at least one pitch period of a plurality of pitch periods contained within audio information of the second packet.

11. (Previously presented) The method of claim 7, wherein the length of the second packet is expanded if the third packet arrives during the latency period associated with the third packet.

12. (Previously presented) The method of claim 1, wherein the length of the second packet is adjusted to compensate for adjustments of the length of the first packet.

13. (Previously presented) An apparatus comprising:

a first VoIP gateway for retrieving a first packet from an input buffer, said first packet having an associated length;

said first VoIP gateway determining pitch associated with audio information contained within said first packet;

said first VoIP gateway determining whether a second packet of said audio information has arrived at said input buffer, said second packet having an expected arrival time and an associated length

said first VoIP gateway adjusting said length of said first packet using at least one pitch period associated with said pitch, responsive to a determination that said second packet arrives after the expected arrival time;

said first VoIP gateway adjusting the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet.

14. (Previously presented) The apparatus of claim 13, wherein said adjusting comprises:

processing at least two adjacent pitch periods to produce a new pitch period.

15. (Previously presented) The apparatus of claim 14, wherein said new pitch period replaces said at least two adjacent pitch periods.

16. (Previously presented) The apparatus of claim 15, wherein said new pitch period is inserted between two of said at least two adjacent pitch periods.

17. (Previously presented) A method of claim 13, wherein said first VoIP gateway determines the length of the second packet.

18. (Previously presented) The apparatus of claim 13, wherein said first VoIP gateway determines an estimated time of arrival (ETA) of the third packet.

19. (Previously presented) The apparatus of claim 18, wherein a target play time comprises the ETA and a latency period of the third packet.

20. (Previously presented) The apparatus of claim 17, wherein the length of the second packet is reduced in response to a timely arrival of the third packet at said input buffer.

21. (Previously presented) The apparatus of claim 20, wherein the length of the second packet is not reduced by a factor greater than two.

22. (Previously presented) The apparatus of claim 21, wherein the length of the second packet is reduced by deleting at least one pitch period of a plurality of pitch periods contained within audio information of the second packet.

23. (Previously presented) The apparatus of claim 19, wherein the length of the second packet is expanded if the third packet arrives during the latency period of the third packet.

24. (Previously presented) The apparatus of claim 23, wherein the length of the second packet is expanded by copying pitch periods contained within audio information of said second packet.

25. (Previously presented) An apparatus for expanding and reducing audio information within packets, comprising:

a processor; and

a storage device coupled to said processor for controlling said processor, said processor comprising instructions operative to:

retrieve a first packet from an input buffer, said first packet having an associated length;

determine pitch associated with audio information contained within said first packet;

determine whether a second packet of said audio information has arrived at said input butter, said second packet having an expected arrival time and an associated length;

in response to a determination that the second packet arrives after the expected arrival time, adjust said length of said first packet using at least one pitch period associated with said pitch; and

adjust the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet.

26. (Previously presented) A computer readable medium having stored thereon a plurality of instructions including instructions which, when executed by a processor, ensures the processor to perform a method comprising:

retrieving a first packet from an input buffer, said first packet having an associated length;

determining pitch associated with audio information contained within said first packet;

determining whether a second packet of said audio information has arrived at said input buffer, said second packet having an expected arrival time and an associated length; and

in response to a determination that the second packet arrives after the expected arrival time, adjusting said length of said first packet using at least one pitch period associated with said pitch; and

adjusting the length of the second packet according to the adjusted length of the first packet and an arrival time of a third packet received after the second packet.

27. (Previously presented) A method of processing a sequence of audio samples, each of said samples being stored within a respective packet, said method comprising:

retrieving a first packet form an input buffer;

determining a pitch within said audio samples for said retrieved packet;

determining whether a second packet of said audio samples has arrived at said input buffer, said second packet having an expected arrival time;

in response to a determination that the second packet arrives after the expected arrival time, adjusting a play time for said retrieved packet using at least one pitch

period associated with said pitch based on an actual arrival time of the second packet; and

adjusting a play time for said second packet based on the adjusted play time of the first packet and an actual arrival time of a third packet.

28 (Previously presented) The method of claim 27, further comprising:

determining an estimated time of arrival (ETA) for the second packet.

29. (Original) The method of claim 28, wherein said play time is a target play time.

30. (Previously presented) The method of claim 29, wherein said target play time includes the ETA of the second packet and a latency period.

31. (Previously presented) The method of claim 30 further comprising:

expanding the play time of said retrieved packet when the second packet arrives during the latency period.

32. (Original) The method of claim 31, wherein the play time of the retrieved packet is expanded by copying pitch periods contained within said retrieved packet.

33. (Previously presented) The method of claim 29 further comprising:

reducing the play time of the second packet when the third packet arrives before an ETA of the third packet.

34. (Previously presented) The method of claim 33, wherein the play time of the second packet is reduced by removing a pitch period within the second packet.

35. (Original) The method of claim 34, wherein the step of reducing is implemented to compensate for the step of expanding.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None